

WHAT IS CLAIMED IS:

1. A method for circuit emulation over a multi-packet label switching (MPLS) network, comprising the steps of:
  - receiving a time division multiplexed data stream at an ingress end;
  - dividing said data stream into a set of fixed sized packets;
  - adding a service header to each of said packets;
  - adding an additional header on top of said service header in accordance with MPLS protocols;
  - removing said additional header after each packet has been processed by said MPLS network; and
  - using said service header to recover said data stream at an egress end.
2. The method of claim 1, further comprising the steps of:
  - monitoring said data stream; and
  - attaching an alarm bit in a service header of a subsequent packet if a break in said data stream is detected.
3. The method of claim 1, further comprising the steps of:
  - using a structure pointer in said service header to indicate whether a header byte in a synchronous payload envelope is present within a packet, said structure pointer indicating the location of said header byte in said packet.
4. The method of claim 3, further comprising the step of:
  - reserving a pointer value indicating that said header byte is not present within said packet.
5. The method of claim 1, further comprising the steps of:
  - recording a stuffing time difference in a service header at said ingress end; and
  - implementing said stuffing time difference at said egress end.

6. The method of claim 1, further comprising the steps of:
- (a) storing a first set of frames into a data buffer;
  - (b) calculating a first data average of said first set of frames in said data buffer to obtain a threshold value;
  - (c) storing a next set of frames into said data buffer;
  - (d) calculating a next data average of said next set of frames in said data buffer;
  - (e) comparing said next data average to said threshold value;
  - (f) if said next data average is greater than said threshold value:
    - (1) generating a negative justification indicator; and
    - (2) sending one more byte at said egress end;
  - (g) if said next data average is less than said threshold value:
    - (1) generating a positive justification indicator; and
    - (2) sending one less byte at said egress end; and
  - (h) repeating said steps (c)-(g).
7. The method of claim 1, further comprising the steps of:
- checking a sequence counter in said service header of each packet in said set of packets;
- locating at least one header byte in said set of packets;
- measuring all bytes between two header bytes; and
- pushing said set of packets into a frame.
8. The method of claim 1, further comprising the steps of:
- checking a sequence counter in said service header of each packet in said set of packets to determine if all packets are present sequentially; and
- inserting a dummy packet if a packet is missing in said set of packets.
9. The method of claim 8, further comprising the steps of:
- receiving an out of sequence packet; and
- discarding said out of sequence packet.

10. The method of claim 1, further comprising the steps of:  
checking a sequence counter in said service header of each packet in said set of packets to determine if all packets are present sequentially;  
terminating a current connection if multiple packets are missing in said set of packets;  
discarding said set of packets; and  
establishing a new connection to begin receiving packets.
11. The method of claim 1, further comprising the steps of:  
checking a sequence counter in said service header of each packet in said set of packets to determine if all packets are present sequentially; and  
establishing an in-frame condition after said set of packets are received in sequence.
12. The method of claim 11, further comprising the steps of:  
determining whether said in-frame condition is valid; and  
terminating a current connection if said in-frame condition is not valid.
13. A computer program product for circuit emulation over a multi-packet label switching (MPLS) network, comprising:  
logic code for receiving a time division multiplexed data stream at an ingress end;  
logic code for dividing said data stream into a set of fixed sized packets;  
logic code for adding a service header to each of said packets;  
logic code for adding an additional header on top of said service header in accordance with MPLS protocols;  
logic code for removing said additional header after each packet has been processed by said MPLS network; and  
logic code for using said service header to recover said data stream at an egress end.

14. The computer program product of claim 13, further comprising:  
logic code for monitoring said data stream; and  
logic code for attaching an alarm bit in a service header of a subsequent packet  
if a break in said data stream is detected.
15. The computer program product of claim 13, further comprising:  
logic code for using a structure pointer in said service header to indicate  
whether a header byte in a synchronous payload envelope is present within a packet,  
said structure pointer indicating the location of said header byte in said packet.
16. The computer program product of claim 15, further comprising:  
logic code for reserving a pointer value indicating that said header byte is not  
present within said packet.
17. The computer program product of claim 13, further comprising:  
logic code for recording a stuffing time difference in a service header at said  
ingress end; and  
logic code for implementing said stuffing time difference at said egress end.
18. The computer program product of claim 13, further comprising:  
(a) logic code for storing a first set of frames into a data buffer;  
(b) logic code for calculating a first data average of said first set of frames  
in said data buffer to obtain a threshold value;  
(c) logic code for storing a next set of frames into said data buffer;  
(d) logic code for calculating a next data average of said next set of frames  
in said data buffer;  
(e) logic code for comparing said next data average to said threshold value;  
(f) if said next data average is greater than said threshold value:  
(1) logic code for generating a negative justification indicator; and  
(2) logic code for sending one more byte at said egress end;

- (g) if said next data average is less than said threshold value:
  - (1) logic code for generating a positive justification indicator; and
  - (2) logic code for sending one less byte at said egress end; and
- (h) logic code for repeating said (c)-(g).

19. The computer program product of claim 13, further comprising:

logic code for checking a sequence counter in said service header of each packet in said set of packets;

logic code for locating at least one header byte in said set of packets;

logic code for measuring all bytes between two header bytes; and

logic code for pushing said set of packets into a frame.

20. The computer program product of claim 13, further comprising:

logic code for checking a sequence counter in said service header of each packet in said set of packets to determine if all packets are present sequentially; and

logic code for inserting a dummy packet if a packet is missing in said set of packets.

21. The computer program product of claim 20, further comprising:

logic code for receiving an out of sequence packet; and

logic code for discarding said out of sequence packet.

22. The computer program product of claim 13, further comprising:

logic code for checking a sequence counter in said service header of each packet in said set of packets to determine if all packets are present sequentially;

logic code for establishing an in-frame condition after all packets for a frame are received in sequence;

logic code for terminating a current connection if multiple packets are missing in said set of packets;

logic code for discarding said set of packets; and

logic code for establishing a new connection to begin receiving packets.

23. The computer program product of claim 22, further comprising:  
logic code for checking a sequence counter in said service header of each packet in said set of packets to determine if all packets are present sequentially; and  
logic code for establishing an in-frame condition after the set of packets are received in sequence.

24. The computer program product of claim 23, further comprising:  
logic code for determining whether said in-frame condition is valid; and  
logic code for terminating a current connection if said in-frame condition is not valid.